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13. ABSTRACT (Maximum 200 words)

The effects of commutative transactions on distributed database performance was analyzed. The benefits were found to be insignificant unless the number of transactions was large. Two distributed algorithms for adaptive replication of data were developed, one which optimizes the communication cost objective function, and a second which optimizes communication time. A dynamic replication control algorithm was studied and showed improved performance over dynamic noting schemes. Concepts for using replicated data in multilevel secure databasses have shown the ability to quarentee one-copy serialability using a small amount of trusted code. There were 14 articles published under this grant.

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1. P. Ammann and S. Jajodia, "Distributed timestamp generation in planar lattice networks," To appear in *ACM Trans. on Computer Systems.*

2. S. Jajodia, R. Mukkamala, and K. V. S. Ramarao, "A view-based dynamic replication control algorithm," To appear in *BIT.*

3. O. Wolfson and S. Jajodia, "An algorithm for dynamic data distribution," *Proc. 2nd IEEE Workshop on Management of Replicated data,* Monterey, Calif, November 1992, pages 62–65.

4. O. Wolfson and S. Jajodia, "Distributed algorithms for dynamic replication of data," *Proc. 11th ACM SIGACT-SIGMOD-SIGART Symp. on Principles of Database Systems,* San Diego, Calif., June 1992, pages 149–163.

5. S. Jajodia and R. Mukkamala, "Measuring the effect of commutative transactions on distributed database performance," *Information Sciences,* Vol. 60, Nos. 1/2, February 1993, pages 91-111.

6. O. Wolfson, S. Jajodia, and Y. Huang, "The cost and time of adaptive data replication," Submitted to *ACM Trans. on Database Systems.*

7. O. Wolfson and S. Jajodia, "An algorithm for dynamic data allocation in distributed systems," Submitted to *Information Processing Letters.*

8. P. Ammann, V. Atluri, and S. Jajodia, "The partitioned synchronization rule for planar partial orders," Submitted to *IEEE Trans. on Knowledge and Data Engineering.*

9. P. Ammann, F. Jaeckle, and S. Jajodia, Concurrency control in a secure multilevel database via a two-snapshot algorithm," Submitted to *Jour. of Computer Security.*

10. D. Mutchler, "Some (naive?) questions about replica control," *Proceedings of the IEEE Workshop on the Management of Replicated Data,* Houston, November 1990, pages 113-116.

11. Y. Zhu and D. Mutchler, "An entropy heuristic for the traveling salesman problem," *Proceedings of the Fifth International Symposium on Methodologies for Intelligent Systems,* Knoxville, October 1990, pages 27-36.

12. D. Mutchler, M. Vose, and Y. Zhu, "An $O(n \log^2 n)$ algorithm for coloring perfect planar graphs," Submitted to *Information Processing Letters*.

13. D. Mutchler, "The multi-player version of minimax displays game-tree pathology," *Proceedings of the Sixth International Symposium on Methodologies for Intelligent Systems*, Charlotte, October 1991.

14. D. Mutchler, M. Van Lent and G. Kingsley., "Time-space tradeoffs in the game of one-suit bridge," To be submitted for journal publication.